New device vacuums clots out of the brain

Penumbra lengthens time stroke patient can be helped

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WASHINGTON -- It's a tiny vacuum cleaner for the brain: A new treatment for stroke victims promises to suction out clogged arteries in hopes of stopping the brain attack before it does permanent harm.

Called Penumbra, the newly approved device is the latest in a series of inside-the-artery attempts to boost recovery from stroke, the nation's No. 3 killer.

Now the question is how to determine which patients are good candidates -- because, illogical as it may sound, unclogging isn't always the best option.

"Is the patient at a stage of stroke where you're going to hurt them by pulling a clot out, or show benefit?" asks Dr. Walter Koroshetz of the National Institutes of Health. "It's good we have devices. Now we have to learn how to use them."

More than 700,000 Americans suffer a stroke each year, and more than 150,000 of them die. Survivors often face serious disability.

Most strokes occur when blood vessels feeding the brain become blocked, starving delicate brain cells of oxygen until they die. For those, the clot-busting drug TPA can mean the difference between permanent brain injury or recovery -- but only if patients receive intravenous TPA within three hours of the first symptoms.

Yet fewer than 5 percent of stroke sufferers get TPA, because they don't get specialized care in time. And of those treated, it only helps about 30 percent, because the clot is often too big or tough for TPA to bust.

Enter Penumbra, an option for patients who miss out on early care -- it can be tried up to eight hours after a stroke strikes -- or if standard TPA treatment fails.

Specialists thread a tiny tube inside a blood vessel at the groin and push it up the body and into the brain until it reaches the clog. Just like a vacuum cleaner, it sucks up the clot bit by bit to restore blood flow.

For the right patient, Penumbra can produce dramatic help, says Dr. Demetrius Lopes of Chicago's Rush University Medical Center, one of two dozen hospitals that tested the device in 125 severe stroke patients.

He points to 45-year-old Aretha Streeter, whose left side remained paralyzed almost an hour after a big dose of TPA. Lopes scanned her brain and spotted a key artery completely blocked. She agreed to the Penumbra experiment, and started moving as Lopes suctioned out the clot. Streeter was walking the next day, and was left with weakness in her arm instead of paralysis.

The study's full results will be presented next month at a meeting of the American Stroke Association.

But the device vacuumed out clots well enough to earn California-based Penumbra Inc. a surprise speedy approval from the Food and Drug Administration in late December. Lopes says it caused few serious side effects and that about 42 percent of successfully treated patients showed significant recovery a month later.

Penumbra isn't the only mechanical clot-buster. Doctors also can try threading a corkscrew-shaped wire called the Merci Retriever through the clot and tugging it out. Researchers also are experimenting with dripping TPA directly on the clot instead of the old IV method, and even beaming the clog with ultrasound waves for an extra jolt.

Here's the rub: Unclogging sometimes does more harm than good in bad strokes, says Koroshetz, deputy director of NIH's National Institute for Neurological Disorders and Stroke.

When the dam is broken and blood rushes into oxygen-deprived brain tissue, it sometimes triggers swelling or a brain hemorrhage. Either can kill.

So treatment is a balancing act: Using brain scans to estimate if the stroke already has killed all the brain tissue it's going to, or whether enough still could be salvaged that it's worth the risk of this injury, Koroshetz explains.

The NIH is financing a 900-patient study comparing standard therapy with different inside-the-artery treatments -- the TPA drip, ultrasound and the Merci Retriever -- to tell whether and how they should be used. Researchers will decide soon whether to include Penumbra in that study.

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